Purpose of the STEM Academic Standards Alignment with STARBASE Curriculum

STARBASE Wisconsin serves fifth grade youth attending public schools in the City of Milwaukee. Milwaukee Public Schools utilizes a variety of academic standard models to identify and explain the learning milestones in Science, Technology, Engineering, and Mathematics (STEM) Curriculum. As we explain to our students, "STARBASE is actually your science and math class."

This document is intended for upper elementary and middle school educators to accurately align and identify the standards taught in the STARBASE Curriculum. STARBASE is typically a 25 hour STEM program which is equivalent to 10 weeks of MPS STEM instruction.* Teachers are encouraged to use these charts to complete the extended learning experiences necessary to meet the Academic Standards for fifth grade. We hope that you find this document to be a valuable resource as you assess and evaluate your students' progress.

Sources for Academic Standards

Common Core Standards: English Language Arts - http://www.corestandards.org/ELA-Literacy/
Common Core Standards: Mathematics - http://www.corestandards.org/Math/
Next Generation Science Standards - http://www.nextgenscience.org/
Wisconsin Technology and Engineering Standards - **http://dpi.wi.gov/sites/default/files/imce/cte/pdf/te_standards.pdf**

- Architecture and Construction
- Engineering
- Leadership
- Manufacturing
- Transportation

*The time is an estimate. 30 minutes of science education is taught each day per district requirements. Information is provided by Milwaukee Public School elementary school teachers.

<table>
<tr><td colspan="4">Title of STEM Strand: Physics and Chemistry - Motion and Force</td></tr>
<tr><td>Performance Expectation</td><td colspan="2">Wisconsin Technology & Engineering Education Standards Connection</td><td>Instructional Resources</td><td>Formative Assessment(s)</td></tr>
<tr><td rowspan="2">Next Generation Science Standard

Motion and Stability: Forces and Interaction MS-PS2-1

Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.</td><td>Elementary School
Architecture and Construction
AC1.e.5.e

Electronics
EL1.a.3.e.

Engineering
ENG2.a.1.e
ENG2.b.1.e
ENG2.b.2.e.
ENG3.a.2.e
ENG4.b.1.e
ENG4.c.2.e
ENG4.a.2.e
ENG4.c.3.e
ENG5.b.1.e

Manufacturing
MNF1.c.2.e
MNF1.c.4.m</td><td>Middle School
Architecture and Construction
AC1.e.7.m

Engineering
ENG2.a.5.m
ENG2.a.4.m
ENG2.b.3.m
ENG 4.b.3.m
ENG4.c.5.m
ENG4.a.4.m

Manufacturing
MNF1.b.3.m

High School
Engineering - ENG5.b.7.h, ENG5.b.8.h</td><td>STARBASE Curriculum

E3.1.1.1. Physics - Newton’s Three Laws of Motion:

Introduction to Newton’s First Law (Parent)
A. Crash Test Dummies

E3.1.1.4 Engineering: Engineering Design Process - Introduction to the Engineering Design Process (Parent)
A. Eggbert</td><td>STARBASE Flight Log:
-Inertia in Action Diagram
- Eggbert Activity Assessment

Students develop and test a restrain for Eggbert’s seat.

Summative Assessment(s)

Post Test: It includes questions from all activities and lessons.</td></tr>
</table>

Middle School Science Standards: Matter and Its Interaction MS-PS1-1, Motion and Stability:Forces and Interaction MS-PS2-1, Engineering Design MS-ETS1-1

Vocabulary

Acceleration	Engineering Design Process	Force
Inertia	Kinetic Energy	Momentum
Potential Energy	Scientific Law	Simulation

Title of STEM Strand: *Physics and Chemistry* - Motion and Force			
Performance Expectation	**Technology and Engineering Education Connection**	**Instructional Resources**	**Formative Assessment(s)**
Next Generation Science Standard Motion and Stability: Forces and Interaction MS-PS2-2 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	**Elementary School** *Engineering* ENG2.b.1.e ENG2.b.2.e. ENG4.c.1.e *Manufacturing* MNF1.a.3.e. *x* *Architecture and Construction* AC1.b.4.e x **Middle School** *Engineering* ENG4.c.5.m ENG4.a.4.m ENG5.b.5.m **High School** *Engineering* ENG5.b.8.h *Technology Engineering Broad-*	*STARBASE Curriculum* E3.1.1.1. Physics: A. Newton's Three Laws of Motion Introduction to Rocketry (Parent) A.Straw Rockets C. CO2 Rockets Dragsters Other sources: *Doctor Zoom's Straw Rocket Video* by Pitsco Education Impulse G3 Race System by Pitsco Education	*STARBASE Flight Log:* -Straw Rocket Launch, Data Charts -CO2 Rocket Dragster Races, Data Charts Students launch and collect data from the CO2 Rocket Car and Straw Rocket tests. **Summative Assessment(s)**

	Based BB1.c.3.m x		Post Test: It includes questions from all activities and lessons.

Middle School Next Generation Science Standards: Motion and Stability: Forces and Interaction MS-PS2-2

Vocabulary

Acceleration	Axis of Rotation	Center of Gravity
Center of Pressure	Force	Gravity
Inertia	Mass	Momentum
Thrust		

Title of STEM Strand: *Physics and Chemistry* - Motion and Force			
Performance Expectation	**Additional Next Generation Science Standards:**	**Instructional Resources**	**Formative Assessment(s)**
Next Generation Science Standard Space Systems 5-PS2-1 Support an argument that the gravitational force exerted by Earth on objects is directed down.	**Middle School** *Motion and Stability Forces and Interaction:* MS-PS2-1	*STARBASE Curriculum* E3.1.1.1. Physics - Newton's Three Laws of Motion: Introduction to Newton's First Law (Parent) A. Crash Test Dummies	*STARBASE Flight Log:* -Inertia In Action Diagram **Summative Assessment(s)** Post Test: It includes questions from all activities and lessons.

Vocabulary

Engineering Design Process	Force	Inertia
Scientific Law	Simulation	

Title of STEM Strand: *Engineering* - Engineering Design Process

Performance Expectation	**Wisconsin Technology & Engineering Education Standards**		**Instructional Resources**	**Formative Assessment(s)**
Next Generation Science Standard: Engineering Design 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	Elementary School	Middle School	*STARBASE Curriculum* E.3.1.1.4 Engineering: A.Engineering Design Process Introduction to Engineering Design Process(EDP) (Parent) A.Eggbert B. Operation Bridge Quest E3.1.1.5 Mathematics A. Number and Number Relationships Figure That!	*STARBASE Flight Log:* -Eggbert's Activity Assessment - Operation Bridge Quest: Engineering Design Process, Steps 2 - 4 -Figure That! Problem 1. and Problem 2. Students build and test a restraint for Eggbert's seat and a floating bridge to save Water's Edge.
	Architecture and Construction AC1.e.5.e x AC1.e.1.e AC1.a.2.e X AC1.g.2.e *Electronics* Technology EL1.a.3.e. *Eng. Broad Based* BB1.b.2.e Engineering BB1.f.2.e ENG1.a.1.e ENG1.a.2.e ENG1.a.3.e ENG1.a. 4.e x ENG2.a.1.e x *Manufacturing* ENG2.b.1.e MNF1.c.2.e ENG2.b.2.e. MNF1.c.4.m ENG3.a.1.e. ENG3.a.2.e x ENG4.b.1.e x ENG4.c.2.e ENG4.a.2.e ENG4.c.3.e ENG5.a.3.e ENG5.b.1.e	*Architecture and Construction* AC1.e.7.m AC1.g.7.m *Engineering* ENG1.a.5.m x ENG1.a.6.m x ENG1.a.7.m x ENG1.a.8.m ENG2.a.5.m x ENG2.a.4.m ENG2.b.3.m ENG 4.b.3.m x ENG4.a.3.m ENG4.c.5.m ENG4.a.4.m *Manufacturing* MNF1.b.3.m MNF1.b.1.e *Tech. and Eng. Broad-Based* BB1.e.4.m x **High School** Engineering ENG5.b.7.h x,	**Common Core Math Connection** **Middle School** *Ratios & Proportional Relationships* 6.RP.A.1 6.RP.A.3.C.	**Summative Assessment(s)** Post Test: It includes questions from all activities and lessons.

		ENG5.b.8.h	7.RP.A.2.D. 7.RP.A.2.	

Middle School Science Standards: Matter and Its Interaction MS-PS1 , Motion and Stability:Forces and Interaction MS-PS2-1, Engineering Design MS-ETS1-1 x , MS-ETS1-2

Vocabulary

Acceleration
Arch Bridge
Beam Bridge
Buoyancy
Clearance
Criteria
Engineer
Engineering Design Process
Expansion Bridge
Floating Bridge
Force
Inertia
Kinetic Energy
Levee
Momentum
Potential Energy
Prototype
Roadbed
Span

<table>
<tr><th colspan="4">**Title of STEM Strand:** *Engineering* - Engineering Design Process</th></tr>
<tr><th>**Performance Expectation**</th><th colspan="2">**Wisconsin Technology & Engineering Education Standards**</th><th>**Instructional Resources**</th><th>**Formative Assessment(s)**</th></tr>
<tr><td rowspan="2">Next Generation Science Standard

Engineering Design
3-5-ETS1-2

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</td><td>Elementary School</td><td>Middle School</td><td rowspan="2">*STARBASE Curriculum*

E.3.1.1.4 Engineering: A.Engineering Design Process
Introduction to Engineering Design Process(EDP): Parent

A.Eggbert
B. Operation Bridge Quest .</td><td>*STARBASE Flight Log:*
-Eggbert's Activity Assessment
- Operation Bridge Quest: Engineering Design Process, Steps 2 - 4

Students build and test a restraint for Eggbert's seat and a floating bridge to save Water's Edge.</td></tr>
<tr><td>*Architecture and Construction*
AC1.e.5.e x
AC1.e.1.e
AC1.a.2.e
AC1.g.2.e

Electronics *Technology*
EL1.a.3.e. *Eng. Broad Based*
BB1.b.2.e
Engineering BB1.f.2.e
ENG1.a.1.e
ENG1.a.2.e
ENG1.a.3.e
ENG1.a. 4.e x
ENG2.a.1.e x
ENG2.b.1.e
ENG2.b.2.e.
ENG3.a.1.e.
ENG3.a.2.e x
ENG4.b.1.e x
ENG4.c.2.e
ENG4.a.2.e
ENG4.c.3.e
ENG5.b.1.e

Manufacturing
MNF1.c.2.e MNF1.c.4.m</td><td>*Architecture and Construction*
AC1.e.7.m
AC1.g.7.m

Engineering
ENG1.a.5.m x
ENG1.a.6.m x
ENG1.a.7.m x
ENG2.a.5.m x
ENG2.a.4.m
ENG2.b.3.m
ENG 4.b.3.m x
ENG4.c.5.m
ENG4.a.4.m

Manufacturing
MNF1.b.3.m
MNF1.b.1.e

Technology and Engineering Broad-Based
BB1.e.4.m

High School
Engineering
ENG5.b.7.h x,
ENG5.b.8.h</td><td>**Summative Assessment(s)**

Post Test: It includes questions from all activities and lessons.</td></tr>
</table>

Middle School Science Standards: Matter and Its Interaction MS-PS1-1, Motion and Stability:Forces and Interaction MS-PS2-1, Engineering Design MS-ETS1-1 x , MS-ETS1-2

Vocabulary

Acceleration	Arch Bridge	Beam Bridge
Buoyancy	Clearance	Criteria
Engineer	Engineering Design Process	Expansion Bridge
Floating Bridge	Force	Inertia
Kinetic Energy	Levee	Momentum
Potential Energy	Prototype	Roadbed
Span		

<table>
<tr><th colspan="4">Title of STEM Strand: Engineering - Engineering Design Process</th></tr>
<tr><th>Performance Expectation</th><th colspan="2">Wisconsin Technology & Engineering Education Standards</th><th>Instructional Resources</th><th>Formative Assessment(s)</th></tr>
<tr>
<td>Next Generation Science Standard

Engineering Design 3-5-ETS1-3

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype can be improved.</td>
<td>Elementary School
Architecture and Construction
AC1.e.5.e x
AC1.e.1.e
AC1.a.2.e
AC1.g.2.e

Electronics
EL1.a.3.e.

Technology Eng. Broad Based
BB1.b.2.e
BB1.f.2.e

Engineering
ENG1.a.1.e
ENG1.a.2.e
ENG1.a.3.e
ENG1.a. 4.e x

ENG2.a.1.e x
ENG2.b.1.e
ENG2.b.2.e.
ENG3.a.1.e.
ENG3.a.2.e x
ENG4.b.1.e x
ENG4.c.2.e
ENG4.a.2.e
ENG4.c.3.e
ENG5.b.1.e

Manufacturing
MNF1.c.2.e
MNF1.c.4.m</td>
<td>Middle School
Architecture and Construction
AC1.e.7.m
AC1.g.7.m

Engineering
ENG1.a.5.m x
ENG1.a.6.m x
ENG1.a.7.m x
ENG2.a.5.m x
ENG2.a.4.m
ENG2.b.3.m
ENG 4.b.3.m x
ENG4.c.5.m
ENG4.a.4.m

Manufacturing
MNF1.b.3.m
MNF1.b.1.e

Tech. and Eng. Broad-Based
BB1.e.4.m

High School
Engineering
ENG5.b.7.h x,
ENG5.b.8.h</td>
<td>STARBASE Curriculum

E.3.1.1.4 Engineering: A.Engineering Design Process
Introduction to Engineering Design Process(EDP): Parent

A.Eggbert
B. Operation Bridge Quest</td>
<td>STARBASE Flight Log:
-Eggbert’s Activity Assessment
- Operation Bridge Quest: Engineering Design Process, Steps 2 - 4

Students build and test a restraint for Eggbert’s seat and a floating bridge to save Water’s Edge.

Summative Assessment(s)

Post Test: It includes questions from all activities and lessons.</td>
</tr>
</table>

Middle School Science Standards: Matter and Its Interaction MS-PS1-1, Motion and Stability:Forces and Interaction MS-PS2-1, Engineering Design MS-ETS1-1 x , MS-ETS1-

Vocabulary

Acceleration
Buoyancy
Engineer
Floating Bridge
Kinetic Energy
Potential Energy
Span
Arch Bridge
Clearance
Engineering Design Process
Force
Levee
Prototype
Beam Bridge
Criteria
Expansion Bridge
Inertia
Momentum
Roadbed

<table>
<tr><td colspan="4">Title of STEM Strand: Physics and Chemistry - Building Blocks of Matter</td></tr>
<tr><td>Performance Expectation</td><td>Wisconsin Technology & Engineering Education Standards</td><td>Instructional Resources</td><td>Formative Assessment(s)</td></tr>
<tr><td rowspan="3">Next Generation Science Standard

Structure and Properties of Matter
5-PS1-1

Develop a model to describe that matter is made of particles too small to be seen.</td><td>Tech. and Engineering Broad-based
BB1.d.1.e

Electronics
EL1.a.5.m</td><td rowspan="3">STARBASE Curriculum

E3.1.1.2 Chemistry:
A.Building Blocks of Matter
Creating & Building Molecular Models

Molly Mod (Atomic Model Kits) - “Organic Student Set”</td><td>STARBASE Flight Log
Molecular Models, “What's the Matter?” (Paragraph and Diagram)

Student build molecular models with kits.</td></tr>
<tr><td>Next Generation Science Standards</td><td>Summative Assessment(s)</td></tr>
<tr><td>Middle School
Matter and Its Interaction
MS-PS1-1</td><td>Post Test: It includes questions from all activities and lessons.</td></tr>
</table>

Vocabulary

Atoms	Compounds	Electrons
Elements	Mass	Molecules
Nucleus	Periodic Table of Elements	Protons
Single and Double Bonds	Weight	

Title of STEM Strand: *Physics and Chemistry* - Building Blocks of Matter and *Mathematics* - Measurements				
Performance Expectation	**Wisconsin Technology & Engineering Education Standards**	**Common Core Mathematics Connection**	**Instructional Resources**	**Formative Assessment(s)**
Next Generation Science Standard Structure and Properties of Matter 5-PS1-3 Make observations and measurements to identify materials based on their properties.	**Elementary School** *Architecture and Construction* AC1.b.4.e *Electronics* EL1.a.2.e *Engineering* ENG5.a.3.e *Technology and Engineering - Broad Based* BB1.b.2.e **Middle School** *Manufacturing* MNF1.a.6.m	**Elementary School** *Measurement & Data* 5.MD.A.1	*STARBASE Curriculum* E3.1.1.2 Chemistry: Physical and Chemical Changes Introduction to Physical and Chemical Changes: Parent E3.1.1.2 Chemistry: A.Building Blocks of Matter Chromatography E3.1.1.5 Mathematics B. Measurement Basic Measurement- Length, Liquid Volume, and Mass	*STARBASE Flight Log:* -CSI Chromatography, Student Identification Chart -Physical and Chemical Changes, Photo Identification Students identify differences and similarities of 2 ice melting blocks. **Summative Assessment(s)** Post Test: It includes questions from all activities and lessons.

Additional Elementary Next Generation Science Standards: Structure and Properties of Matter - 5-PS1-3, 5-PS1-4

Middle School Next Generation Science Standards: Matter and Its Interaction - MS-PS1-2 x , MS-PS1-4

Vocabulary

Absorbent	Adsorbent	Analytical Chemistry
Capillary Action	Chemical Changes	Chemiluminescent Reaction
Chromatography	Chromatogram	Cooling
Energy	Gases	Heating
Kinetic Energy	Law of Conservation of Energy	Matter
Medium	Molecule	Non-polar Molecules
Physical Change	Pigments	Plasma
Polar Molecules	Potential Energy	Solid
Solute	Solubility	Solvent
State of Matter	Temperature	

<table>
<tr><th colspan="4">Title of STEM Strand: Physics and Chemistry - Building Blocks of Matter</th></tr>
<tr><th>Performance Expectation</th><th>Wisconsin Technology & Engineering Education Standards</th><th>Instructional Resources</th><th>Formative Assessment(s)</th></tr>
<tr><td rowspan="3">Next Generation Science Standard

Structure and Properties of Matter
5-PS1-4

Conduct an investigation to determine whether the mixing of two or more substances results in new substances.</td><td>Elementary School
Technology and Engineering - Broad Based
BB1.b.2.e

Electronics
EL1.a.2.e</td><td rowspan="3">STARBASE Curriculum

E3.1.1.2 Chemistry:
Physical and Chemical Changes
Introduction to Physical and Chemical Changes: Parent

E3.1.1.2 Chemistry -
Physical and Chemical Changes
A.Warm Ups and Cool Downs</td><td>STARBASE Flight Log:
-Physical and Chemical Change, Photo Identification
-Warm Up and Cool Down, Physical and Chemical Changes</td></tr>
<tr><td>Common Core Math Connection</td><td>Summative Assessment(s)</td></tr>
<tr><td>Elementary School
Geometry
5.G.A.1
5.G.A.2

Middle School
The Number System
6.NS.C.6.C.</td><td>Post Test: It includes questions from all activities and lessons.</td></tr>
</table>

Additional Elementary Next Generation Science Standards: Structure and Properties of Matter - 5-PS1-4
Middle School Next Generation Science Standards: Matter and Its Interaction - MS-PS1-2 and MS-PS1-4

Vocabulary

Celsius Temperature Scale
Control
Exothermic Reaction
Heat
Matter
Plasma
State of Matter
Chemical Changes
Cooling
Experimental Design
Kinetic Energy
Molecule
Polar Molecules
Temperature
Chemiluminescent Reaction
Endothermic Reaction Energy
Gases
Law of Conservation of Energy
Physical Change
Potential Energy

Title of STEM Strand: *Mathematics* - Measurements and Physics and *Chemistry*				
Performance Expectation	**Next Generation Science Connection**	**Wisconsin Technology & Engineering Education Standards**	**Instructional Resources**	**Formative Assessment(s)**
Common Core Mathematics Numbers & Operation in Base Ten 5.NBT. A.2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	**Elementary School** 5.ESS 2-1 **Common Core Mathematics Connection** **Elementary School** *Measurement & Data* 5.MD.A.1 **Middle School** *Ratios & Proportional Relationships* 6.RP.A.3.C.	**Elementary School** *Architecture and Construction* AC1.b.4.e *Engineering* ENG5.a.3.e x *Manufacturing* MNF1.a.3.e. **Middle School** *Manufacturing* MNF1.a.6.m	*STARBASE Curriculum* E3.1.1.5 Mathematics B. Measurement Basic Measurement- Length, Liquid Volume, and Mass E3.1.1.2 Chemistry C. Atmospheric Properties Introduction to Atmospheric Properties (Parent)	*STARBASE Flight Log:* -Basic Measurement: Metric System Notes - Figure That!, Problems 1 and 2 -Atmospheric Properties: Gases in the Atmosphere Students convert a percentage into a decimal equivalent by dividing with a power of 10. **Summative Assessment(s)** Post Test: It includes questions from all activities and lessons.

Vocabulary

Criteria	Cylinder	Decimal	Denominator
Digital Scale	Equivalent Fraction	Fraction	Graduated Cylinder
Grams	Liter	Meter	Meter Stick
Metric System	Numerator	Numerical Data	Percent
Quantify	Volume		

Title of STARBASE STEM Strand: *Technology* - Applying Technology and *Engineering* - Computer Aid Design			
Performance Expectation	**Wisconsin Technology & Engineering Education Standards Connections**	**Instructional Resources**	**Formative Assessment(s)**
Wisconsin Technology & Engineering Standard: Engineering ENG 5.b.3.e. Discuss following steps-by-step directions to assemble a product**.**	**Elementary School** *Engineering* ENG5.a.1.e x x ENG5.b.3.e *Technology and Engineering Broad Based* BB1.b.1.e **Middle School** *Engineering* ENG4.a.4.m ENG5.a.4.m x x ENG5.b.5.m	*STARBASE Curriculum:* E3.1.1.3 Technology: Innovation Introduction to Robotics: Parent B. Robotics Challenge LEGO(R) NXT Robotics Platform E3.1.1.4 Engineering: B. 3-D Computer Aided Design(CAD) DoD Mandatory PTC Modules - Creo Creo Parametric 3-D CAD	Students complete and test the mission-ready vehicle. Or, they can design and download their robots' program to navigate a course. The robot's ability to navigate the course is scored by a rubric. **Summative Assessment(s)** Post Test: It includes questions from all activities and lessons.

Vocabulary

Assemble	Component	Computer Aid Design	
Mission Ready Vehicle	Programming Language	Ribbon	Tab
Robot	Robotics	Robot Program	Working Directory

Title of STEM Strand: *Physics and Chemistry* - Motion and Force and *Mathematics* - Data Analysis				
Performance Expectation	**Wisconsin Technology & Engineering Education Standards**	**Common Core Math Connection**	**Instructional Resources**	**Formative Assessment(s)**
Next Generation Science Standard *Energy* MS-PS3-1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.	**Elementary School** *Architecture and Construction* AC1.b.4.e x *Manufacturing* MNF1.a.3.e. **Middle School** *Engineering* ENG5.b.5.m *Technology & Engineering Broad-Based* BB1.c.3.m **High School** 9-12 ENG5.b.8.h	**Elementary School** *Geometry* 5.G.A.1 5.G.A.2 **Middle School** *Ratios & Proportional Relationships* 6.RP.A.1 *The Number System* 6.NS.C.6.C	STARBASE Curriculum E3.1.1.1 Physics - A. Newton's 3 Laws of Motion 1. C. CO2 Rocket Dragsters E3.1.1.5 Mathematics - D. Data Analysis Straw Rocket Launch Other Sources: *Doctor Zoom's Straw Rocket* Video	*STARBASE Flight Log:* - Graph of Straw Rocket Launch, Data Analysis **Summative Assessment(s)** Post Test: It includes questions from all activities and lessons.

Middle School Next Generation Science Standards: *Energy* - MS-PS3-1

Vocabulary

Acceleration	Axis of Rotation	Center of Gravity
Center of Pressure	Force	Gravity
Inertia	Mass	Momentum
Thrust		

<table>
<tr><td colspan="3">Title of STEM Strand: STEM Careers- STEM Careers on Military Facilities</td></tr>
<tr><td>Performance Expectation</td><td>Instructional Resources</td><td>Formative Assessment(s)</td></tr>
<tr><td>Wisconsin Technology & Engineering Education Standards

Manufacturing
Elementary School
MNF1.c.2.e and
Middle School
MNF1.c.4.m

Recognize characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and manufacturing settings.</td><td>STARBASE Curriculum
-STEM Careers on Military Facilities

Other Sources:
-Presentations from STEM Professionals

-U.S. Bureau of Labor Statistics’ Career Exploration, Online Resource

-DoD STARBASE Video about Careers on a Military Base

-Career Clusters Interest Survey from the Oklahoma Department of Career and Technology Education

-The Career Book: Explorer by Rick Trow Productions</td><td>The Career Book’s online survey.

Summative Assessment(s)

Post Test: It includes questions from all activities and lessons.</td></tr>
</table>

Title of STEM Strand: *Chemistry*, *Mathematics* - Data Analysis and *Technology* - Applying Technology			
Performance Expectation	**Wisconsin Technology & Engineering Education Standards**	**Instructional Resources**	**Formative Assessment(s)**
Common Core Mathematics *Geometry* 5.G.B.4 Graph points on the coordinate plane to solve real-world and mathematical problems.	**Elementary School** *Architecture and Construction* AC1.b.4.e	*STARBASE Curriculum* E3.1.1.3 Technology B. Navigation and Mapping Introduction to Navigation and Mapping (Parent) B. Search and Rescue on the Big Island of Hawaii E3.1.1.2 Chemistry B. Physical and Chemical Changes Introduction to Physical and Chemical Changes (Parent) **A. Warm Ups and Cool Downs** E3.1.1.5 Mathematics - D. Data Analysis Straw Rocket Launch Other Sources: -*Doctor Zoom's Straw Rocket* Video -"Big Island of Hawai'i Map" -CD and GEOINT visual maps prepared by the National Geospatial Intelligence Agency (NGA)	*STARBASE Flight Log:* -Search and Rescue Mission on the Big Island of Hawai'i Mission 1 and 2 -Warm Up and Cool Down Activity, Endothermic and Exothermic Process -Data Analysis - Rocket Launch, Graphing Data *Search and Rescue on the Big Island of Hawaii* Students read coordinates on a map to rescue a cyclist and determine the location of search and rescue vehicles. *Warm Ups and Cool Downs and Straw Rocket Launch Data* Students graph the data (distance and temperature) collected in their experiments to determine the type of reaction or identify the fastest rocket.

	Common Core Mathematics Connection		Summative Assessment(s)
	Elementary School *Geometry* 5.G.A.1 x x 5.G.A.2 x x **Middle School** *The Number System* 6.NS.C.6.C. x X *Ratios & Proportional Relationships* 6.RP.A.1		Post Test: It includes questions from all activities and lessons.

Next Generation Elementary Science Standards: *Structure and Properties of Matter* Grade 5 -5-PS1-4
Middle School Science Standards: *Energy* - MS-PS3-1

Vocabulary

Acceleration	Axis of Rotation	Cartography	Center of Gravity	
Center of Pressure	Compass Rose	Contour Interval	Contour Lines	Coordinates
Dependent Variable	Elevation	Equator	Evasion Chart(EVC)	Force
Geospatial Intelligence (GEOINT)	Gravity	Imagery Analysis	Independent Variable	Inertia
Latitude	Legend	Longitude	Map	Mass
Momentum	NGA	Navigation	Prime Meridian	Ratio
Satellite	Satellite Imagery	Scale Bar	Thrust	

Title of STEM Strand: *Mathematics* - Number and Number Relationships and *Engineering* - Engineering Design Process

Performance Expectation	**Wisconsin Technology & Engineering Education Standards**		**Instructional Resources**	**Formative Assessment(s)**
Next Generation Science Standard *Engineering Design* MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	**Elementary School** *Architecture and Construction* AC1.a.2.e x AC1.e.5.e AC1.e.1.e AC1.g.2.e *Engineering* ENG1.a.4.e ENG5.a.3.e *Technology and Engineering Broad-based* BB1.b.2.e BB1.f.2.e	**Middle School** *Architecture and Construction* AC1.g.7.m *Engineering* ENG1.a.5.m x ENG1.a.6.m x ENG1.a.7.m x ENG1.a.8.m ENG4.a.3.m *Technology and Engineering Broad-based* BB1.e.4.m x	*STARBASE Curriculum* E3.1.1.5 Mathematics A. Numbers and Number Relationships Figure That! E3.1.1.4 Engineering A. Engineering Design Process Introduction to the Engineering Design Process (Parent) B. Operation Bridge Quest	*STARBASE Flight Log:* -Figure That!, Chart for Problem 1 and 2. -Operation Bridge Quest, Steps 2 - 4
	Common Core Math Connection			**Summative Assessment(s)**
	Middle School *Ratios & Proportional Relationships* 6.RP.A.1 6.RP.A.3.C. 7.RP.A.2.D. 7.RP.A.2.			Post Test: It includes questions from all activities and lessons.

Middle School Next Generation Science Standards: MS-ETS1-1
High School Technology Education Standards: Engineering - ENG5.b.7.h

Vocabulary

Acceleration	Arch Bridge	Beam Bridge
Buoyancy	Clearance	Criteria
Engineer	Engineering Design Process	Expansion Bridge
Floating Bridge	Force	Levee
Prototype	Roadbed	Span